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Dutch NMCA launches Open data

This paper describes the effects of launching open data in the Netherlands. Not only the Dutch Kadaster serves its topographical database as open data, but also many other organisations make their geographical data available to stimulate the development of innovative applications for society.

Introduction

Since January 2012 the Dutch Cadastre, Land Registry and Mapping Agency (Kadaster) has made its topographic data freely available to the general public. In the Netherlands, the idea to open data has been stimulated by European Commission policies such as the INSPIRE Directive, an infrastructure for environmental spatial information and the Public Sector Information (PSI) Directive as well as the Digital Agenda for Europe initiative.

The Key Register Topography (BRT) is openly available, which contains digital topographical maps at scales of 1:10,000 (TOP10NL) to 1:1,000,000. Other datasets are also freely available in the Netherlands, such as the Key Register Buildings and Addresses. The BRT data can be downloaded as raster or vector files and is also published as reference map in web portals.

One of the goals of the Digital Agenda for Europe strategy and the PSI Directive is to stimulate job creation for society. With access to all these datasets, small and medium enterprises can build applications, and subsequently create jobs and stimulate economic growth.

In the meantime, other public and governmental organisations have started to make data open, like road information and satellite images. Linking different sources of data together can lead to innovative new applications, e.g. satellite data is used for monitoring agriculture. In order to make the data from various sources compatible, a web portal was created known as the PDOK (Public Data On the Map). It is an initiative of different governmental organisations, all who contribute data. This collaboration is in itself an innovative approach, as years ago public bodies and governmental departments did not communicate well with each other. Thanks to PDOK, their datasets and reference information is easily accessible and in a compatible way.

Other users can add their own data for special applications. The BRT data can also be viewed and used via commercial applications such as Openstreetmap and ArcGISonline. The last one has put the TOP10NL as a geographical basis for the Dutch territory.

Current research is looking at the effects of open data on small and medium enterprises.

This paper will describe the effects of launching open data in the Netherlands. The focus will be on the use of the open data and the benefits for society.

Dutch Kadaster

The Cadastre, Land Registry and Mapping Agency (Kadaster) collects and registers administrative and spatial data on property and the rights involved. Kadaster is responsible for national mapping and maintenance of the national reference coordinate system. They

produce and manage the Key Registers Cadastre and Topography. Furthermore, Kadaster has an advisory body for land-use issues and national spatial data infrastructures. Other services are RO-online, the web portal for spatial planning information and KLIC, cable and pipeline information.

Key Registers

A Key Register is a system that houses data information essential for the public sector. After several years of preparation the Dutch government has defined 13 Key Registers. (See figure 1). They are from both the geo-information field as the non-geo-information field. The first 6 Registers are: Register of Persons, Cadastral Register, Register of Companies, Register of Addresses, Register of Buildings and Register of Topography. In the coming years other Registers will follow including the Register of Large Scale Topography (1:1,000) and Register of Subsoil (geology and soil).

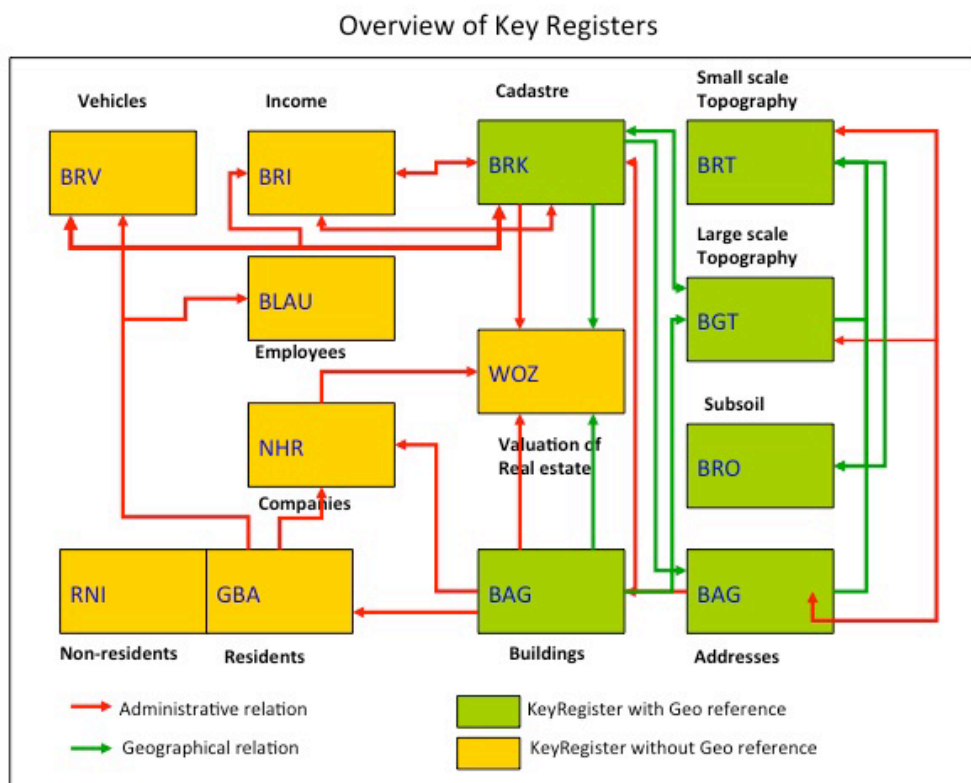


Figure 1 Key Registers in the Netherlands

In the 1990's, initiatives were started to realise Key Registers for essential administrations of the Netherlands. Both geographical and non-geographical (administrative) data were defined. Information exchange is very important in the direct contact between government and citizens and businesses. Reliable and accurate data are necessary for reacting to questions from citizens and companies, for adequate policy development and for maintaining security. One goal is that citizens and businesses provide data to the government only one time. The national and local authorities then have the obligation to exchange the data within their administrations. Another reason for establishing Key Registers is the fact that there are innumerable governmental databases, all being controlled by their own authority, without possibilities to exchange data between these authorities.

Now different public organisations are working hard to set up Key Registers. There are 12 general conditions for establishing a Key Register:

- Key Registers are regulated and established under Dutch law.
- Governmental organisations are obligated by law to use them.

- Governmental users are obligated by law to report errors or other irregularities.
- Liability
- Financing is arranged.
- Content of the datasets is well defined and catalogues are available.
- Procedures and standards for data distribution are clear.
- Accessibility is guaranteed.
- Quality of the data is assured.
- Involvement by governmental organisations is obliged.
- Relations between Key Registers are defined by keeping in mind 'Capture data once, use many times'
- Control and responsibilities are covered by reliable organisations

Key Register Topography (BRT)

The Key Register Topography consists of digital topographic data sets at different scales. TOP10NL, the digital topographic dataset at the scale 1: 10,000 is the most used. The derived/generalised topographic data sets at the scales 1:50,000, 1:100,000, 1: 250,000, 1:500,000 and 1:1,000,000 are a part of the Key Register Topography since 1st January 2010. With the introduction of TOP10NL, a large number of technical and substantive renewals are realised in the field of topographical data. It is one of the first object-oriented topographical databases in Europe.

Key Register Addresses and Buildings (consists of two Key Registers) (BAG)

The Key Register Addresses and Buildings (BAG) is also part of the System of Key Registers. The law determines that municipalities register basic information about buildings and addresses in an automated system. All municipalities make these data available through a national provision (BAGLV). Kadaster manages the national provision and makes the information available to various customers. The BAG improves governmental service to citizens and businesses. By sharing information between authorities, citizens and companies only have to pass a change of address to a municipality once.

Key Register Large-scale Topography (BGT)

In the Key Register Large-scale Topography (BGT), all objects present in a terrain are captured such as houses, roads and watercourses. The BGT is a new Register based on the current Large-scale Base Map of the Netherlands (GBKN) at the scale 1:1000, but in order to meet the specification demands of a Key Register the content, structure and production organisation has to be changed. The Register will be ready in 2015. Then all governments will be able to use the same basic set large-scale topography of the Netherlands.

Key Register Subsoil (BRO)

The Key Register Subsoil is a combination of two existing registrations: the Registration Data and Information from the Dutch subsoil (deeper subsoil) (DINO) and the Soil Information System (BIS). It contains information about the geological and soil structure, underground infrastructure and usage rights. In a later stage information about archaeology and environmental quality will be added to the BRO

The road to open data

Since long time open data were a wish of many users. The Dutch users of topographical maps and digital data, and also people in many other European countries, considered topographical data too expensive. In discussions they cited the situation in the United States, where information collected and paid by the taxpayers is free of charge for the users or they only pay the delivery costs.

In the analogue era this discussion already existed, but with the on-going digitization, digital maps were initially more expensive than paper maps or transparencies, which were used by professional users. The Topografische Dienst, once a unit of the Ministry of Defence, used to produce the topographic maps in the Netherlands.

Although military usage was the primary use of the maps, already in the 19th century they were also delivered to civil agencies such as provinces, municipalities, water boards, central Government and citizens. The Ministry funded the Topografische Dienst, but the civil users paid the cost of the products they purchased.

This changed in the 1990s, when the military need of maps reduced and civil needs increased. In the same period the transition from analogue to digital production took place. The price of digital products was considerably higher than the paper maps, because it was decided that the joint civil customers had to yield around 50% of the production costs, while the other 50% was paid by the Ministry of Defence.

The use of the digital data between 1990 and 2010 was approximately 80 a 90% by public users (municipalities, provinces, water boards and public services) and 10 a 20% by companies and citizens. The high price of the digital topographic data gave a lot of discussion. Most of the data were used by governmental organizations, which caused money flow between governments. The question arose whether it was efficient that Governments mutually brought products in account.

In the late 1990s, independently, the need for a central digital topographic-geographically database at the scale 1: 10,000 emerged, which could be used by all public authorities and jointly produced and financed. This so-called Geographical core database was described in the study reports of the RAVI (Raad van Advies voor VastgoedInformatie).

The database had to fulfil some basic technical and content-related conditions, including object-oriented format according to international standards and exchangeable between various GIS software packages.

Meanwhile in 2000, the Topografische Dienst started the conversion of the line-oriented TOP10vector file in an object-oriented form, called TOP10NL. Further use was made of the new standards from the ISO 19000 series of geographic information. GML was chosen as the independent exchange format.

European initiatives for open data

There are different European directives and regulations to stimulate the open data. As there are the Inspire Directive, the Copernicus/GMES initiative, the Public Sector Information (PSI) Directive and the Digital Agenda of Europe. They all encourage the governmental data producers to distribute their data for free or at minimal costs.

Because the business models of the NMCA's in Europe are very different, there are great differences in availability of geographic data. A number of countries have (a part of) the topographical and other data characterized as Open data, other countries need to earn money by selling the data.

This is logical, because many organizations are not financed (totally or partly) by their government. The income of selling their products is needed for continuing their operations.

Some quotes from European regulations:

INSPIRE Directive:

DIRECTIVE 2007/2/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE)

Article 14

1. Points (a) and (b) of Article 11(1) are available to the public free of charge.

Member States shall ensure that the services referred to in

2. By way of derogation from paragraph 1, Member States may allow a public authority supplying a service referred to in point (b) of Article 11(1) to apply charges where such charges secure the maintenance of spatial data sets and corresponding data services, especially in cases involving very large volumes of frequently updated data.

3. Data made available through the view services referred to in point (b) of Article 11(1) may be in a form preventing their re- use for commercial purposes.

4. Where public authorities levy charges for the services referred to in points (b), (c) or (e) of Article 11(1), Member States shall ensure that e-commerce services are available. Such services may be covered by disclaimers, click-licenses or, where necessary, licenses.

Epsi Platform, November 2009: the European Knowledge economy

"Increase availability of public sector information for re-use. We will increase availability of public sector information for reuse, in accordance with the spirit of and the conditions established by Public Sector Information Directive 2003/98/EC. We will encourage the reuse of public data by third parties to develop enriched services that maximise the value for the public. New demand-led information products and services enabled by the reuse of public sector information will support the transition of Europe to a knowledge-based economy."
{source: Epsi Platform}

Digital Agenda: Turning government data into gold

Brussels, 12 December 2011 – The Commission has launched an Open Data Strategy for Europe, which is expected to deliver a €40 billion boost to the EU's economy each year. Europe's public administrations are sitting on a goldmine of unrealised economic potential: the large volumes of information collected by numerous public authorities and services. Member States such as the United Kingdom and France are already demonstrating this value. The strategy to lift performance EU-wide is three-fold: firstly the Commission will lead by example, opening its vaults of information to the public for free through a new data portal. Secondly, a level playing field for open data across the EU will be established. Finally, these new measures are backed by the €100 million which will be granted in 2011-2013 to fund research into improved data-handling technologies. These actions position the EU as the global leader in the re-use of public sector information. They will boost the thriving industry that turns raw data into the material that hundreds of millions of ICT users depend on, for example smart phone apps, such as maps, real-time traffic and weather information, price comparison tools and more. Other leading beneficiaries will include journalists and academics. Commission Vice President Neelie Kroes said: "We are sending a strong signal to administrations today. Your data is worth more if you give it away. So start releasing it now: use this framework to join the other smart leaders who are already gaining from embracing open data. Taxpayers have already paid for this information, the least we can do is give it back to those who want to use it in new ways that help people and create jobs and growth."

Also the Copernicus/GMES Regulation is based on the as far as possible freely availability of geographical data. In addition to the available satellite data the so called in-situ data, data that are not from satellites, such as topography, sensor data and other thematic data, should be freely available.

Copernicus/GMES Open Data Licences

Open data licences aim at maximal downstream re-uses and are therefore well suited for public data re-use and redistribution. They are the nearest approximation of the public domain status. We are witnessing an important shift toward open data rationality that was advocated by the Public Sector Information Directive¹⁹ in 2003. Open data licences may still have some obligations to be fulfilled by the licensee like an attribution to the data generator.
{Source}: Workshop on GMES Data and Information Policy
12-13 January 2012 Elements for a Data and Information Policy}

Definition of open data

In general the following definition is used for open data:

Open data consists of sources of raw public information that meet the following conditions:

- The data is public;

- There is no copyright or other rights of third parties;
- The data are funded from public funds, made available for the implementation of public tasks;
- The data preferably meet to 'open standards' (no barriers for the use of ICT users or by ICT providers);
- Open Data is preferably computer-readable, so that search engines can find information in documents.

BRT as Open Data

In Netherlands the call to label the BRT as Open data became stronger. In addition to the professional use by Governments, the demand for the maps and databases stayed behind, because, for many types of applications by business and individuals, alternatives emerged. We can mention Google-maps, Bing maps and OpenStreetMap (OSM). The latter, which has great detailed and actual data in the Netherlands, has added a selection of a relatively old TOP10vector data. For individuals and specifically for recreational applications it fulfills the needs. Companies and Governments also often use Google maps as background for their applications.

On the other hand the Key Registers are the only authentic data for official use and it should be promoted that they were used for official applications of the governmental organizations. In 2011, the Minister of Housing Spatial Planning and Environment (VROM) (now called Ministry of Infrastructure and Environment) declared the Key Register Topography (BRT) as Open Data starting at 1st January 2012.

The Minister of Economy Agriculture and Innovation (EL&I) Verhagen had decided to open a satellite data portal where raw satellite data is available as open data.

Anticipating the availability of detailed satellite data in 2014 en 2015, when new European satellites become operational (Sentinels), the minister want to give the private companies the opportunity to develop innovations using the satellite data. The current developments are focused on applications which support the agricultural sector, especially the precision agriculture.

Reasons to declare BRT as open data are:

- The BRT is considered as the base map for Netherlands at the scale 1:10,000 and smaller.
- To remove financial and licensing obstacles and to increase the use of the data
- By using the same maps as analysis tool by different organisations and applications the results are better comparable.
- The data is authentic; the quality is known and recorded in the meta-data.

Which other datasets are available?

- Municipal and provincial borders from the cadastral map
- Key register Addresses and Buildings (BAG)
- Spatial plans
- Data on the Dutch coordinate reference system.

User Conditions

The use of the BRT is mandatory for Governmental organizations as they can be used in their applications. This improves the exchange between organizations using the same geographical data.

The organizations have also the duty to report back if there are mistakes or insufficiencies in the data. This will improve the quality and actuality of the data. These remarks and messages will be checked by the kadaster employees and updated in the databases.

The topographic data is made available under a CC-BY license. This means that:

- you may copy, distribute and transmit data;
- You may make derivative products;

- Use for commercial purposes is allowed;
- for any reuse or distribution, the name of Kadaster should be mentioned: "CC-BY Kadaster", followed by the year of publication;
- Kadaster preserves the intellectual property rights (such as the database right).

Quality control

Kadaster continuously checks the quality of the databases. To do this, random 5% of the produced areas are examined. Also is required by law that every 3 years a third party checks the data from the BRT. This review is executed on the basis of a control protocol that, among other things, checks the logical consistency, positional accuracy, actuality, completeness and the thematic accuracy of data.

Current products from the BRT

- TOP10NL: The most detailed digital topographic database. Among other things used for viewing, editing and visualization of geo-information.
- TOPvector: Digital topographic vector files on two scale levels: 1:50,000 and 1:250.000. Suitable in applications for adding or editing data.
- TOPgrenzen: Digital topographic database with all municipal provincial and national borders of Netherlands. Suitable for use in statistical applications.
- TOPraster: Digital map series with raster files on three different scales: 1:25,000, 1:50,000 and 1:250,000. Suitable as a base- or reference map for CAD and GIS applications.
- TOPnames: Digital database with geographical names (toponyms). Suitable to add to other topographic or thematic data.

What are the effects of open data

In cooperation with Wageningen University, Kadaster examines the effects of the open data policy on the Key Register Topography.

To this end, a questionnaire has been sent to customers of the BRT that have ordered the data since January 1, 2012.

The investigation is on-going and more details are expected in 2013.

At this time (March 2013) there are 40 responses.

The short survey included the following questions:

1. What type of user are you? (Answer see figure 2)
2. What parts of the BRT are you using? (Answer see figure 3)
3. For which applications in your organization the BRT is used? (Answer see figure 4)
4. What is the ratio of the functions?
5. Are you aware that the BRT is available as open data since 1st January 2012? (Answer: 92,5% Yes)
6. How far helps an open BRT realizing your organizational goals? (Answer: 52,5% Totally, 40% partly, 7,5% not)
7. Do you use the BRT for products/services for third parties (this is per 1/1/2012 allowed)? (Answer: 55% yes, 45% no)
8. How do you deliver the Key Register Topography to third parties? (Answer: 30% not-edited, 70% edited)
9. For which applications the delivered products/services are used by third parties? (See figure 5)

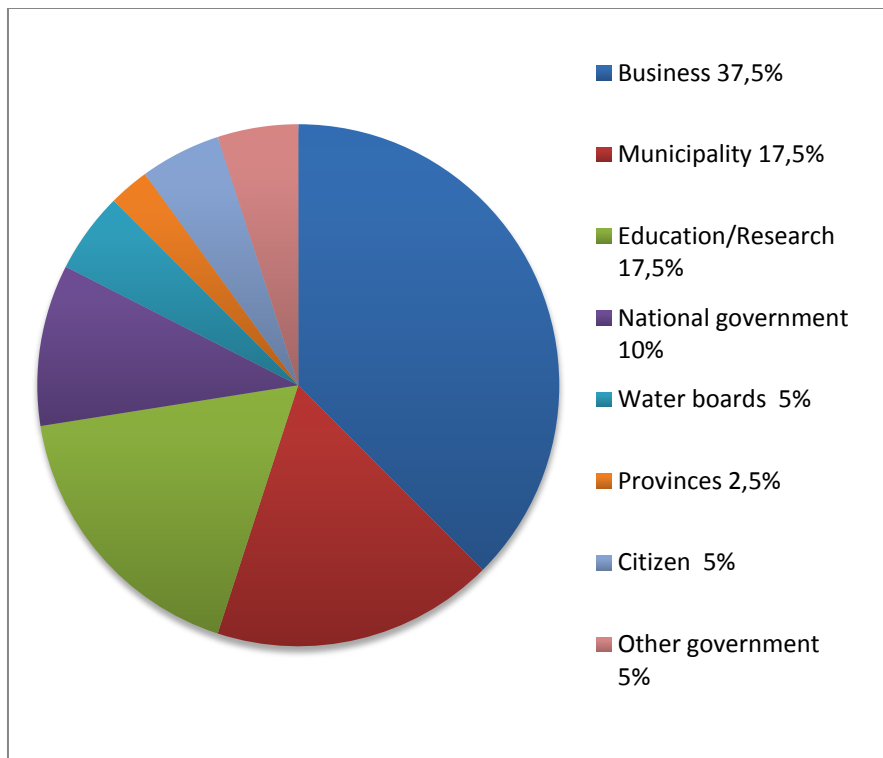


Figure 2 Types of users of BRT open data

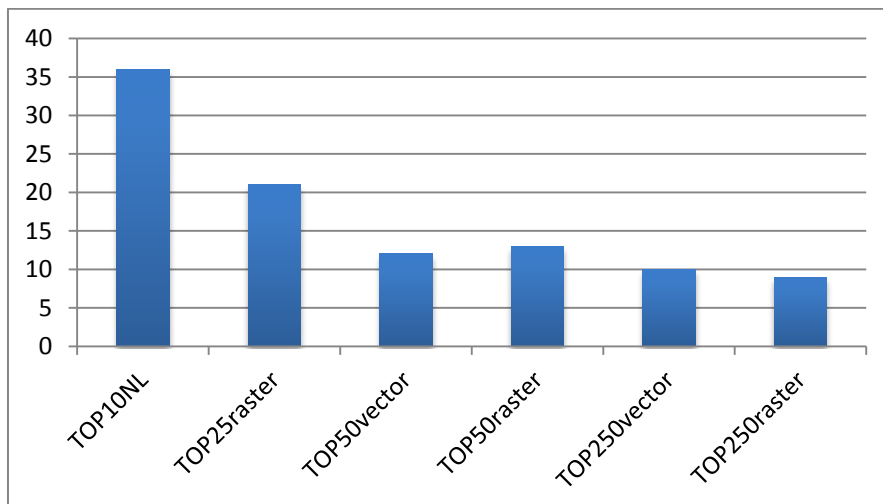


Figure 3 Use of BRT products

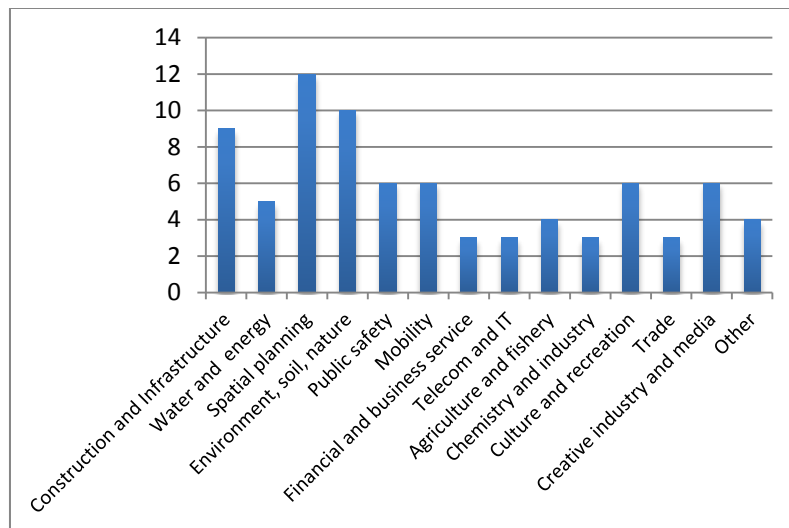


Figure 4 Applications for which BRT is used by customer

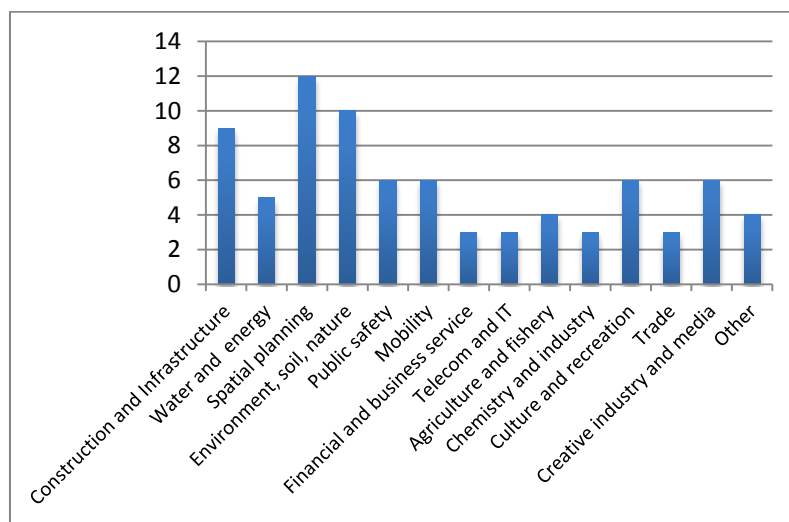


Figure 5 Applications for which BRT is used by third party

Some examples of the current use

The use of the free BRT data can be divided in use via web portal and download of vector or raster data. Further on other users have made their own applications based on BRT, mostly combined with other data.

The highest score of use of the data is via the web portal PDOK (Public Data on the Map).

This website serves many datasets for use by government, but also for private use. Since the start of the website in October 2012 the number of map requests has been logged. Figure 6 shows the use of the PDOK services in number of map requests per week. A map request is a request from a user to a full-screen map image. The above graph gives an overview about the last 20 weeks and shows the 10 services most requested in February 2013.

The use of BRT background map is rising as well as administrative borders.

In figure 6 the yellow line shows the use of the BRT background map and the light blue the TOP10NL (1:10,000 scale vector database).

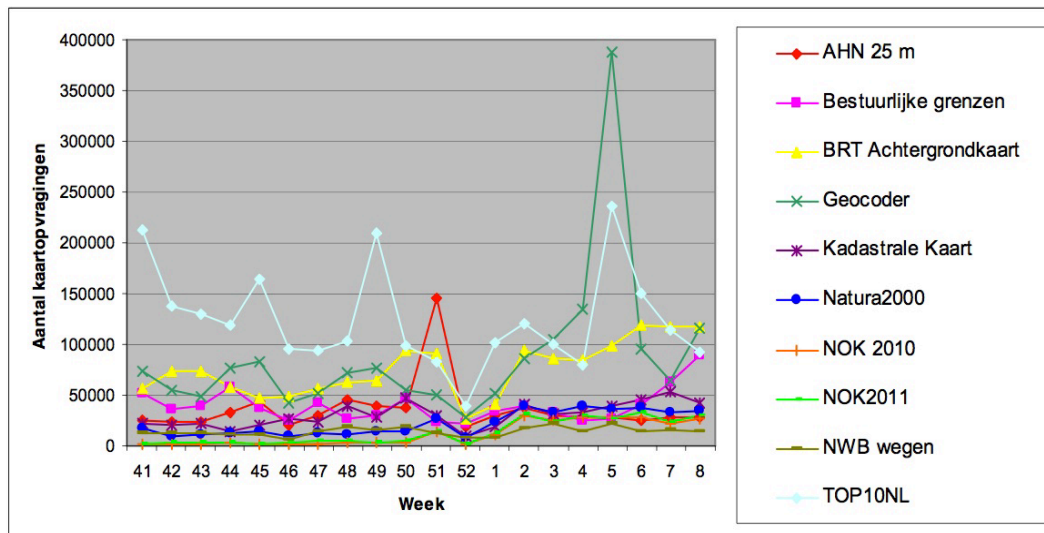


Figure 6 Map requests via PDOK portal

The web portal of ESRI, www.ArcGISOnline.com, uses the BRT, especially the TOP10NL as general background map in the worldwide topographical web portal (See figure 7).



Figure 7 BRT background map in ArcGISonline

The well-known OpenStreetMap also uses selections of the BRT as geographical map, so this map shows more detail of land use and buildings, which are not collected or digitized by the volunteers. (See figure 8)

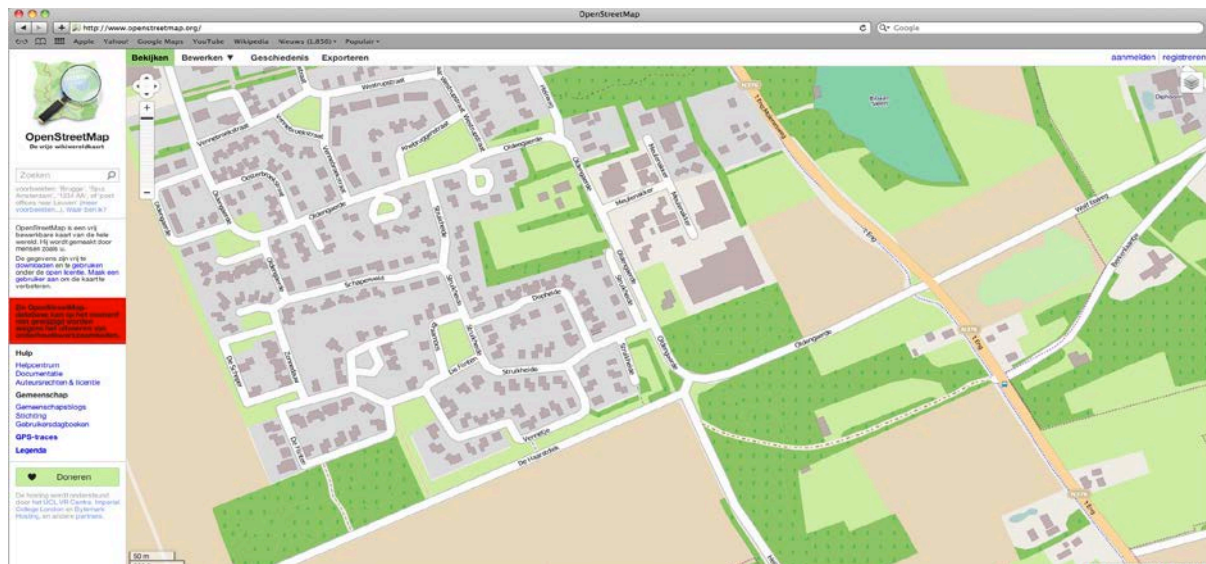


Figure 8 Openstreetmap, partly filled with BRT data

Other private companies or small businesses develop app for smart phones. An example is the Topo GPS app, which can be bought for € 3,59 at iTunes (See figure 9).

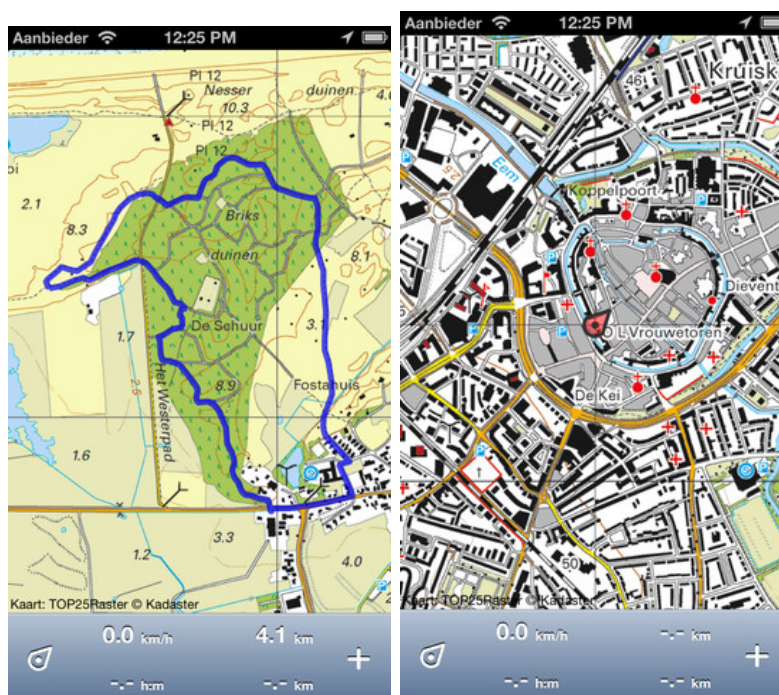


Figure 9 Examples of Topo GPS map on iPhone.

Another web portal www.Atlasleefomgeving.nl shows many aspects of the environment in the Netherlands. Citizens can see where physical pollutions are or sound nuisance and can discuss on the forum about environmental themes

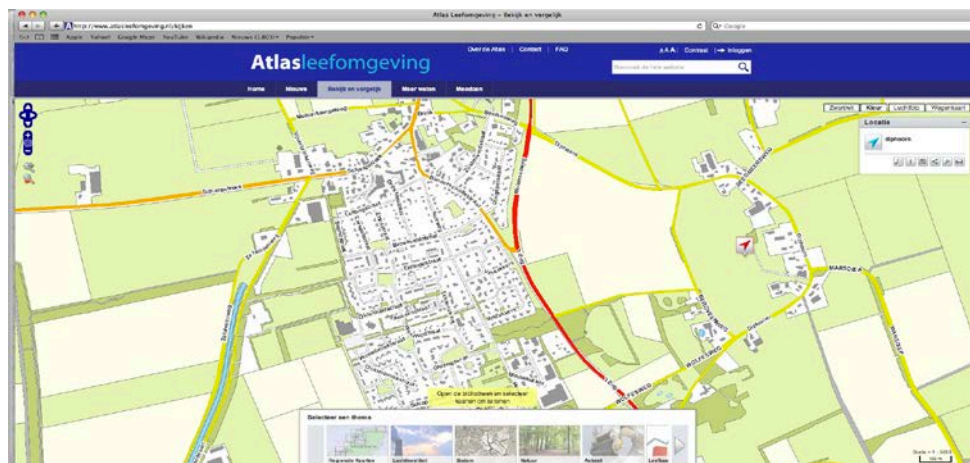


Figure 10 Web portal Atlasleefomgeving.

Other examples are for recreational use (See figure 11) and for inventory of objects (see figure 12)

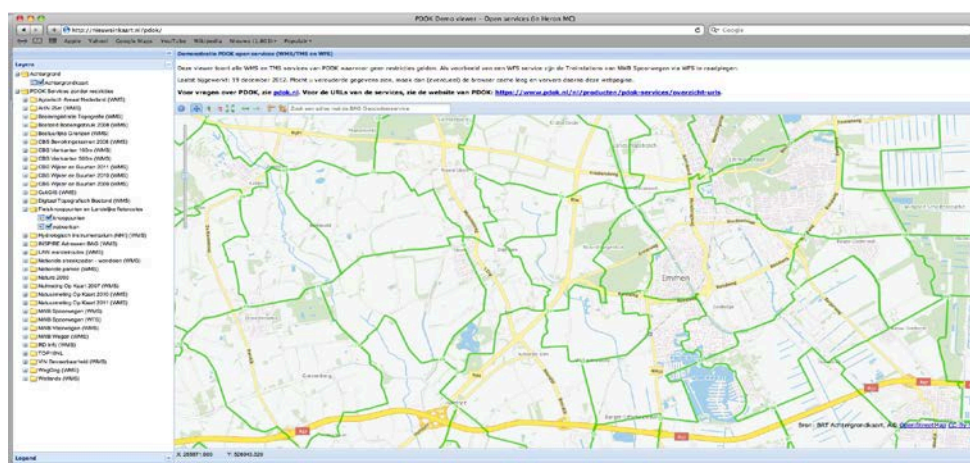


Figure 11. Use of BRT background map for recreational cycle routes



Figure 12 Municipality Nijmegen has an inventory of monumental buildings and trees

Conclusions

In the past decade, more and more government data became available as open data.

Started by European initiatives such as INSPIRE, GMES/Copernicus and the PSI directive and, to deal with cross-border environmental pollution and security motives which need high-quality and up-to-date geographical information, governments are willing to open their data, despite the prevailing business models and licensing issues. In addition, there is the economic motive that small and medium-sized enterprises can take advantage of free geodata as it offers chances for many new applications and innovations. Releasing the Key Register Topography (BRT) has led to a significant growth of use of the data as downloaded databases as well as reference map in many web portals. The preliminary results of the research on the effects of the open data of the BRT shows that the users are satisfied and new applications see the light.